

CLAIMS

1. A composite material composed of metal and inorganic particles having a smaller coefficient of thermal expansion than said metal, characterized in that said inorganic particles dispersed in such a way that 95% or more of them (in terms of their area in cross-section) form aggregates of complex configuration joining together.

2. A composite material composed of metal and inorganic particles having a smaller coefficient of thermal expansion than said metal, characterized in that said inorganic particles are individually present such that they count 100 or less in a sectional area of 100 μm square, with the remainder dispersing in the form of aggregates of complex configuration joining together.

3. A composite material composed of metal and inorganic particles having a smaller coefficient of thermal expansion than said metal, characterized in that said inorganic particles ~~are~~ have a Vickers hardness of 300 or less.

4. A composite material composed of metal and inorganic particles having a smaller coefficient of thermal expansion than said metal, said composite material having a coefficient of thermal expansion which increases by 0.025-0.035 ppm/ $^{\circ}\text{C}$ on average per W/m \cdot K at 20 $^{\circ}\text{C}$ in the range of 20-105 $^{\circ}\text{C}$.

5. A composite material composed of metal and inorganic particles having a smaller coefficient of thermal expansion than said metal, characterized in that said inorganic particles ~~are dispersed~~ disperse in the form of aggregates ^{ed} joining together, said aggregates elongating ^{ed} in the direction of plastic working.

6. A composite material composed of copper and copper oxide particles, characterized in that said copper oxide particles disperse in such a way that 95% or more of them (in terms of their area in cross-section) form aggregates of complex configuration joining together.

7. A radiator plate for a semiconductor device which is made of said composite material described in any of claims 1 to 6.

8. A radiator plate for a semiconductor device as defined in claim 7, including a nickel plating layer thereon.

9. A semiconductor device which comprises a plurality of insulating substrates and a plurality of semiconductor elements mounted on each of said insulating substrates, each of said insulating substrates having said radiator plate directly joined to said insulating substrate through a conductive layer formed on the upper and lower surfaces of said insulating substrate.

10. A semiconductor device which comprises an insulating substrate with a radiator plate and a

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semiconductor element mounted on said insulating substrate, wherein said radiator plate is the one defined in Claim 7 or 8.

11. A semiconductor device which comprises a semiconductor element mounted on a radiator plate, a lead frame joined to said radiator plate, and metal wiring to electrically connect said lead frame with said semiconductor element, said semiconductor element being sealed with plastics, wherein said radiator plate is the one defined in Claim 7 or 8.

12. A semiconductor device which comprises a semiconductor element mounted on a radiator plate, a lead frame joined to said radiator plate, and metal wiring to electrically connect said lead frame with said semiconductor element, said semiconductor element being sealed with plastics and said radiator plate being open at the side opposite to the side to which said semiconductor element is joined, wherein said radiator plate is the one defined in Claim 7 or 8.

13. A semiconductor device which comprises a semiconductor element mounted on a radiator plate, pins for connection with external wiring, a ceramics multilayer wiring substrate having at its center an open space to hold said semiconductor element, and metal wiring to electrically connect said semiconductor element with the terminals of the substrate, said radiator plate and said

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substrate being joined to each other such that said semiconductor element is installed in said space, and said substrate being joined to a lid such that said semiconductor element is isolated from the atmosphere, wherein said radiator plate is the one defined in Claim 7 or 8.

14. A semiconductor device which comprises a semiconductor element mounted on a radiator plate, terminals for connection with external wiring, a ceramics multilayer wiring substrate having at its center a recess to hold said semiconductor element, and metal wiring to electrically connect said semiconductor element with the terminals of the substrate, said radiator plate and the recess of said substrate being joined to each other such that said semiconductor element is installed in said recess, and said substrate being joined to a lid such that said semiconductor element is isolated from the atmosphere, wherein said radiator plate is the one defined in Claim 7 or 8.

15. A semiconductor device which comprises a radiator plate, a semiconductor element joined onto said radiator plate with a thermally conductive resin, a lead frame joined to a ceramics insulating substrate, and a TAB to electrically connect said semiconductor element with the lead frame, said radiator plate and said substrate being joined to each other such that said semiconductor element

is isolated from the atmosphere, and said semiconductor element and said insulating substrate being separated by a thermally conductive elastic resin interposed between them, wherein said radiator plate is the one defined in Claim 7 or 8.

16. A semiconductor device which comprises a first radiator plate, a semiconductor element joined to said radiator plate with metal, a second radiator plate joined to a grounding plate, said first radiator plate being mounted on the grounding plate of the radiator plate, and a TAB electrically connected to the terminals of said semiconductor element, said semiconductor element being sealed with plastics, wherein said radiator plate is the one defined in Claim 7 or 8.

17. A dielectric plate for electrostatic attractors which is made of the composite material defined in any of Claims 1 to 6.

18. An electrostatic attractor which comprises an electrode layer and a dielectric plate bonded to said electrode layer, said dielectric producing an electrostatic attractive force upon application of a voltage to said electrode layer such that an object is fixed onto the surface of said dielectric plate, wherein said dielectric plate is the one defined in Claim 17.

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